UNITED STATES PATENT AND TRADEMARK OFFICE

K

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/575,237	05/22/2000	Hiroyuki Akashi	P00,0483	1992

26263 7590 01/15/2003

SONNENSCHEIN NATH & ROSENTHAL
P.O. BOX 061080
WACKER DRIVE STATION
CHICAGO, IL 60606-1080

EXAMINER
CHANEY, CAROL DIANE

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 01/15/2003

16

Please find below and/or attached an Office communication concerning this application or proceeding.

A 8-16

Office Action Summary	Application No. 09/575,237	Applicant(s) AKASHI ET AL.	
	Examiner Carol Chaney	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) *11-38* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Election/Restrictions

Applicant's election of species 1, claims 1-10 in Paper No. 8 filed 14 January 2002 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 1-38 remain pending in the application, although claims 11-38 have been withdrawn from consideration.

Claim Rejections - 35 USC § 103

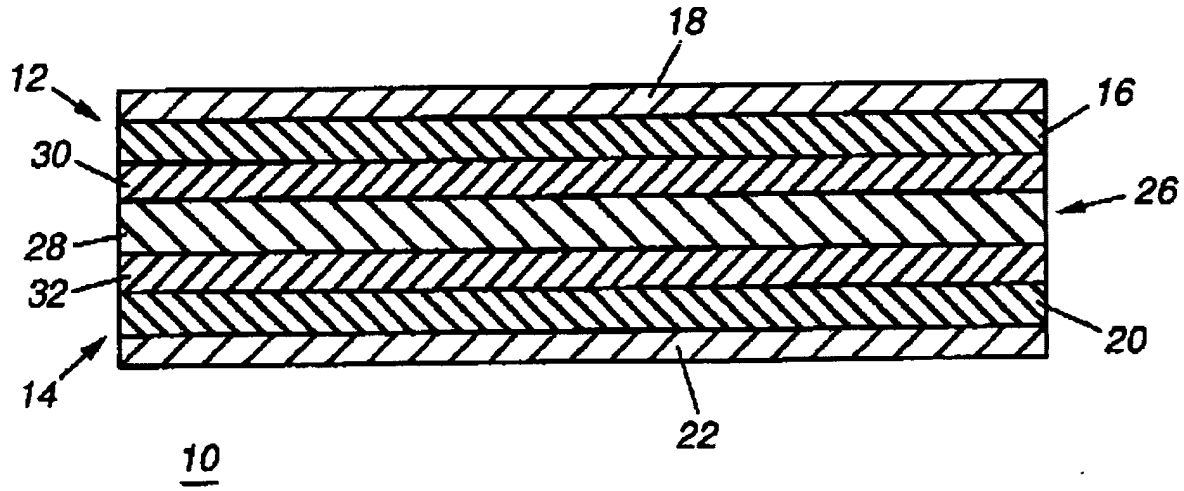
The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pendalwar, US Patent 5,716,421.

Pendalwar et al. disclose a battery which includes a lithium intercalation material cathode (14), a carbon anode (12) and an electrolyte system (26). (Note column 3, lines 24-40 and 51-64.)

The electrolyte system includes an inert phase (28) and absorbing phases (30, 32). The inert phase may include a plurality of porous polymeric layers, formed from polyalkenes such as polyethylene, polypropylene, or other polymers such as polytetrafluroethylene, polyethyleneterephthalate, polystyrene, ethylene propylene diene monomer, nylon, and combinations thereof. In one preferred embodiment, layer 54 is fabricated of polyethylene, while layers 56 and 58 are fabricated of

polypropylene. (Note column 4, lines 33-41.) In a preferred embodiment, the commercially available material Celgard 2300, was used as the inert separator. (Example 1, column 5, lines 51-53.)



Cross-section of battery, US Patent 5,716,421 Figure 1.

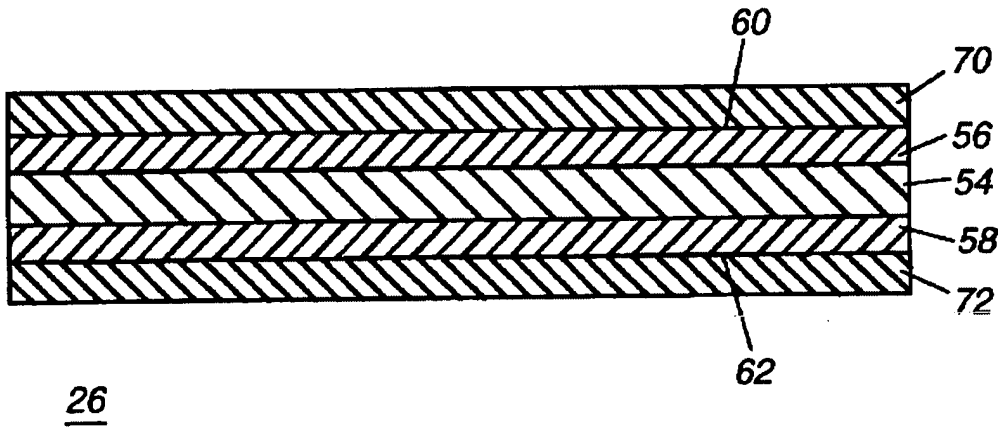


FIG. 2

Cross-section of electrolyte system, US Patent 5,716,421

The layers 70 and 72 are absorbing or gel forming polymers. The absorbing or gel-forming polymer may be selected from the group of polymers including polyvinylidene fluoride (PVDF), polyurethane, polyethylene oxide, polyacrylonitrile, polymethylacrylate, polyacrylamide, polyvinylacetate, polyvinylpyrrolidone, polytetraethylene glycol diacrylate, copolymers of any of the foregoing, and combinations thereof. Because polyvinylidene fluoride/hexafluropolypropylene copolymers are commercially available materials, marketed as Hylar, KF, Kynar and Kynar Flex polymers, one of ordinary skill in the art would recognize the above-mentioned listing to encompass polyvinylidene fluoride/hexafluropolypropylene copolymers.

The solvent used with the gel forming polymer may be, but is not limited to, propylene carbonate (PC), ethylene carbonate (EC), diethyl carbonate (DEC), dimethyl carbonate (DMC), dipropylcarbonate dimethylsulfoxide, acetonitrile, dimethoxyethane, tetrahydrofuran, n-methyl-2-pyrrolidone (NMP), acetone and combinations thereof.

When the battery system taught by Pendalwar et al. is heated above a threshold temperature, (135 °C for polyethylene) one or more of the polymer support structure layers (54, 56, 58 of Fig. 2) will melt, thereby cutting off ionic conductivity in the battery. The battery impedance is higher at 135 °C than it is at room temperature. (Note Figure 5.)

The disclosure of Pendalwar et al. differs from applicants' invention in that Pendalwar et al. do not recite specific thicknesses or porosities of porous separator layers. However, Pendalwar et al. use Celgard 2300 as an exemplary separator material. Celgard 2300 is polyolefin flat sheet membrane. Typical porosities and thickness of Celgard flat sheet membranes are from 30-60% and 8-50 μm respectively. (See http://www.celgard.net/products/fsmproperties.cfm) Therefore, one of ordinary skill in the art would consider a polyolefin porous film having a porosity not less than 25% nor greater than 60% and a thickness not less than 5μm and not greater than 15μm to be suggested by the teachings of Pendalwar.

Response to Arguments

Applicant's arguments filed 05 August 2002 have been fully considered but they are not persuasive. Applicants assert nothing in either the Pendalwar et al. or the Spotnitz et al. references would have suggested a solid electrolyte battery with a separator having a polyolefin porous film with a porosity not less than 25% nor greater than 60% and a thickness not less than 5μm and not greater than 15μm. However, these properties are considered to be suggested by the Pendalwar reference because they are within the range of porosity and thickness properties typically found for the separator material suggested by Pendalwar et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol Chaney whose telephone number is (703) 305-3777. The examiner can normally be reached on Mon - Fri 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 703-308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Carol Chaney
Primary Examiner
Art Unit 1745

cc
January 11, 2003